REMARKS

Claims 1-15 are pending in this application. By this Amendment, claims 1, 3, 6, 8, 11 and 12 are amended. Reconsideration of the rejections, in view of the forgoing amendments and the following remarks is respectfully requested.

I. Restart of the Period for Response

Applicant notes that the Petition for Restart of the Statutory Period for Response was granted on December 16, thereby making the expiration of the extendible period for response on March 16, 2004.

II. Formal Matters Satisfied

The Office Action objects to the drawings. Applicant respectfully submits that the objected to drawing figures, 24-26 and 31, were replaced with new drawings sheets filed along with the August 5, 2003 Amendment which included a "Related Art" legend. Because the Office Action summary refers only to the drawings filed with this application, Applicant assumes that the Examiner failed to consider the replacement drawings filed with the August 5 Amendment. Confirmation by the Examiner is respectfully requested.

The Office Action objects to paragraph [0042] of the specification stating that element 300 should be changed to element 200. Applicant respectfully submits that element 300, as shown in Figs. 2-4 is the counter substrate. The counter substrate 300 is shown as being positioned above the element substrate 200. Moreover, the reference number 300 does not appear in paragraph [0042]. Thus, Applicant is confused by this objection. Clarification by the Examiner is respectfully requested.

III. Claims 1-15 Defined Patentable Subject Matter

Applicant appreciates the Office Action's indication that claims 2, 3, 7 and 8 would be allowable if rewritten to incorporate the features of the independent claim and any intervening

claims. Applicant respectfully submits that all pending claims define patentable subject matter.

The Office Action rejects claims 1, 4, 6, 9, 11 and 15 under 35 U.S.C. §103(a) over U.S. Patent 5,867,140 to Rader in view of the allegedly admitted prior art described in the specification of this application, U.S. Patent 5,861,863 to Kudo et al. and further in view of U.S. Patent 6,545,653 to Takahara et al. Applicant respectfully traverses the rejection.

In particular, Applicant respectfully submits that the combination of applied references fails to suggest or disclose a driving method of a display device for driving pixels which are arranged at each of intersections of a plurality of scanning lines and a plurality of data lines comprising, setting a pixel at each of intersections of particular ones of the plurality of scanning lines and particular ones of the plurality of data lines to be in a display state, while the remaining pixels are set to be in a non-display state, selecting particular scanning lines, one line for every horizontal scanning period with a selection voltage supplied to the selected scanning line for one of two split halves of the one horizontal scanning period, the polarity of the selection voltage being inverted with respect to an intermediate value every two or more horizontal scanning periods, supplying each of the scanning lines other than the particular scanning lines with a non-selection voltage which is inverted in polarity with respect to the intermediate value every one or more vertical scanning periods, supplying each of the particular data lines with a on-display voltage in accordance with content to be displayed on a pixel at an intersection of the selected scanning line and the particular data line for a period during which the selection voltage is supplied to the selected scanning within one horizontal scanning period for selecting one of the particular scanning lines, the particular data line being supplied with the on-display voltage and the off-display voltage for substantially equal periods within the one horizontal scanning period for the selected scanning line, and supplying the data line other than the particular data line with the off-

display voltage for a period during which the scanning lines are consecutively selected in response to the polarity of the selection voltage supplied to the selected scanning lines, wherein the polarity of the off-display voltage is inverted in synchronization with the period of polarity inversion of the selection voltage, as recited in independent claim 1, and similarly recited in independent claims 6 and 11.

Rader instead teaches a display system which is capable of switching between a partial display mode and a full display mode, wherein the partial display mode provides power savings over the full display mode. In Rader, when the device is operating in the partial image display mode, the input switch 414 is held in position B, and the input contact 428 is connected to the output 430. This allows the contents of the FIFO memory 416 to circulate while the DMA channel 406, and optionally the display image buffer 304, are disabled or powered down. This partial display mode eliminates the necessity to operate the DMA channel 406 and the need for repeated DMA access to the large display image buffer 304. The input switch is moved from the input contact 426 to input contact 428 when the first pixel of the first row to be displayed in the top of partial display region 305 is at the output of FIFO memory 416. However, nowhere in Rader is there suggestion or disclosure that the polarity of the selection voltage is inverted with respect to an intermediate value applied to the data line every two or more horizontal scanning periods as alleged by the Office Action. The portions of Rader relied upon in the Office Action do not support this allegation.

The allegedly admitted prior art, referring to a conventional four-value driving method, teaches that as the scanning signal Y_j, a selection voltage $+V_S$ is supplied for one horizontal scanning period 1H, and then a non-selection voltage $+V_D/2$ is supplied and held for a whole period. After one vertical scanning period, 1V has elapsed from a preceding selection, a selection voltage $-V_S$ is applied at a non-selection voltage $-V_D/2$ is supplied and held for a whole period. This series of steps is repeated while one of the voltages $\pm V_D/2$ is

supplied as the data signal Xi. When a selection voltage of $+V_S$ as a scanning signal Yj is applied to one scanning line, the selection voltage $-V_S$ as a scanning signal Yj+1 is applied to the next scanning line. In this way, the polarity of the selection voltage is inverted every horizontal scanning period. See page 16, paragraph [0046] of the specification of this application. However, in this four-value driving method, cross-talk can occur in an area of the display screen when the switching periods of the voltages $\pm V_D/2$ of the data signal is supplied to the data line in the area which coincides with the inversion period of the scanning signal. The selection voltages on the mutually adjacent scanning lines are opposite to each other in polarity. As a result, a density difference takes place between pixels on the odd row and the pixel on the even row.

A solution to this problem is further suggested in the specification at paragraph [0050] of the specification of this application. This solution divides one horizontal scanning period 1H into a first half and a second half. The selection voltage is supplied to the scanning line for the second half 1/2H, while the ratio of applying the voltage $-V_D/2$ and the voltage $+V_D/2$ to the data signal during one horizontal scanning period 1H is set to be 50%. In this improved four-value driving method, each of the application periods of the voltage $-V_D/2$, and $+V_D/2$ is half the one horizontal scanning period in the data signal Xi if any pattern is presented. Accordingly, cross-talk is prevented. However, as discussed in paragraph 60, in this improved method, the pixel capacitor C_{LC} in the non-display area is subject to frequent charging and discharging for a duration during which a scanning line 312 in a display area is selected. Power consumption is thus not reduced. For example, as shown in Fig. 27, when the non-selection voltage of the scanning signal Yj to the scanning line 312 belonging to the display area is kept to $+V_D/2$, the data signal Xi to the data line 212 assigned to the non-display area corresponds to an off display and the data signal is alternately switched between the voltage $-V_D/2$ and the voltage $+V_D/2$ every half the horizontal scanning period

1H. The pixel capacitor C_{LC} is charged and discharged twice per horizontal scanning period 1H. Moreover, this method requires the generation and selection of the zero voltage in addition to voltages $\pm V_S$ and $\pm V_D/2$, thus making the construction of the driving voltage generator circuit more complex.

To overcome these deficiencies of the conventional four-value driving method, this invention selects the scanning lines one by one and supplies the selected scanning line with the scanning signal containing the selection voltage when the selected scanning line falls within the display area and selects the scanning line with a non-selection voltage when the selected scanning line falls within the non-display area. The polarity of the scanning signal is inverted every one or more vertical scanning period. Secondly, for the duration during which the scanning line falls within the selected display area, the polarity inversion period of the selection voltage is set to be two or more horizontal scanning periods. The data signal supplied to the data line 212 within the non-display area is fixed to a voltage corresponding to an off display throughout one horizontal scanning period to reduce the voltage switching frequency of the data signal for the non-display area. Third, for the duration during which the scanning line falling within non-display area is selected, the polarity of the data signal for the data line within the non-display area is switched for a predetermined period so the power consumed by the pixels within the non-display area is reduced.

Kudo et al. teaches that in a liquid crystal driving method it is desirable to switch polarity of the applied voltages during both the selection and the non-selection period to prevent degradation of the liquid crystal device. However, as admitted by the Office Action, Kubo et al. does not teach the particular data line being supplied with the on-display voltage and the off-display voltage for substantially equal periods within the one horizontal scanning period for the selected scanning line.

The Office Action relies upon Takahara to teach inverting the polarity of the selection voltage every two horizontal scanning periods in order to prevent flicker. However, Takahara fails to supply the deficiencies of Rader as discussed above.

In addition to the deficiencies of the rejection based on the combination of applied references, Applicant submits that the rejection is based on improper hindsight reconstruction. The Office Action has drawn individual claim features from among the various references without considering whether it would have been intuitive to combine them. Moreover, the only clear motivation to combine them appears to come from Applicant's disclosure. However, assuming for arguments sake that sufficient motivation to combine does exist, the rejection still fails to establish a prima facie case of obviousness for the reasons discussed above.

In view of the forgoing, Applicant respectfully submits that independent claims 1, 6 and 11 are patentable over the combination of applied references. Dependent claims 4, 9 and 15 are also patentable over the combination of applied references for at least the same reasons as independent claims 1, 6 and 11. Accordingly, Applicant respectfully requests that the rejection of claims 1, 4, 6, 9, 11 and 15 be withdrawn.

The Office Action rejects claims 5 and 10 under 35 U.S.C. §103(a) over Rader in view of the allegedly admitted prior art, Kudo et al., Takahara et al. and further in view of U.S. Patent 6,181,313 to Yokota et al.; and rejects claims 12-14 under 35 U.S.C. §103(a) over Rader in view of the allegedly admitted prior art, Kudo et al. and Takahara et al. and further in view of U.S. Patent 6,512,506 to Shimada. Applicant respectfully traverses the rejections.

In particular, Applicant submits that neither Yokota et al. nor Shimada supply the deficiencies of Rader, the allegedly admitted prior art, Kudo et al. or Takahara et al. as discussed above. Accordingly, Applicant respectfully requests that the rejection of claims 5, 10 and 12-14 also be withdrawn.